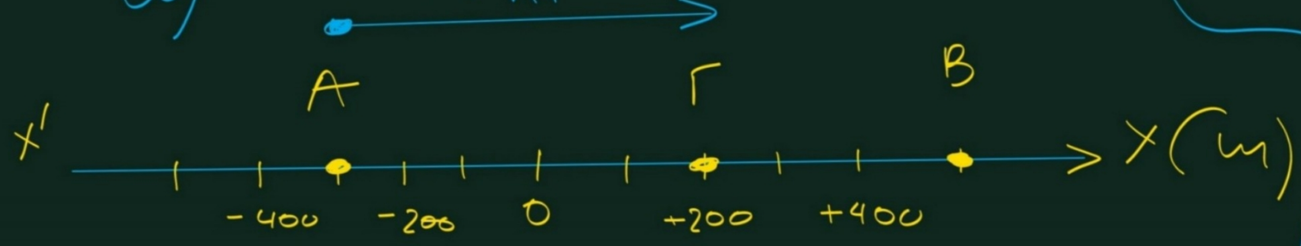
Εφ. 2.31 (Φυλλαδίου)

α) $\vec{\Delta x}_{A\Gamma}$ (διανυσματικά)



$x_A = -300\,m$

$x_B = +500\,m$

$x_\Gamma = +200\,m$

$A \to B \to \Gamma$

$\Delta x_{A\Gamma} = x_\Gamma - x_A =$

$= +200 - (-300) =$

$\Delta x_{A\Gamma} = +500\,m$ (αλγεβρική τιμή)

β) Συνολικό διάστημα:

$S_{AB\Gamma} = |\Delta x_{AB}| + |\Delta x_{B\Gamma}| =$

$= |x_B - x_A| + |x_\Gamma - x_B|$

$= |500 - (-300)| + |200 - 500|$

$= |800| + |-300| =$

$= 800 + 300 = 1100\,m$

γ) $U_{\text{μέση}} = \frac{\text{ολικό διάστημα}}{\text{ολικός χρόνος}}$

$U_\mu = \frac{S_{AB\Gamma}}{\Delta t_{AB\Gamma}} = \frac{1100}{10} = 110\,m/s$

Ταχύτητες

$v = \frac{\Delta x}{\Delta t}$ μέση αλγεβρική

$\vec{v} = \frac{\Delta \vec{x}}{\Delta t}$ μέση διανυσματική

$v_\mu = \frac{S_{ολ}}{t_{ολ}}$ μέση

$v = \frac{\Delta x}{\Delta t} \Rightarrow \frac{v}{1} = \frac{\Delta x}{\Delta t} \Rightarrow$

$\Delta x = v \cdot \Delta t$

Αλλά: $\Delta x = x - x_0$

και $\Delta t = t - t_0$

x_0 = αρχική θέση

t_0 = αρχικός χρόνος (συνήθως μηδέν)

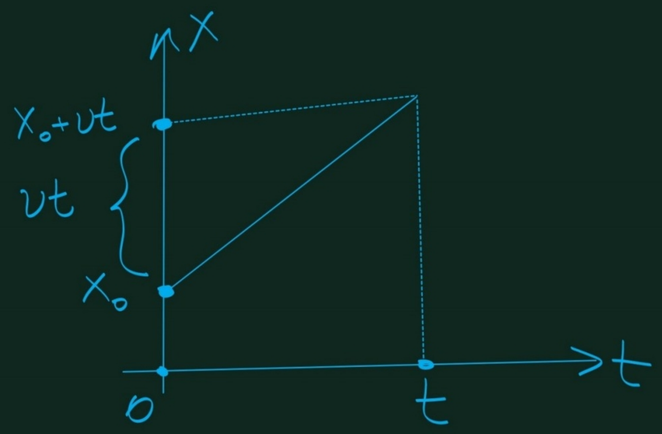
Άρα αν $t_0 = 0$ έχουμε: $x - x_0 = v \cdot t \Rightarrow$

$\boxed{x = x_0 + vt}$ εξίσωση θέσης

Αν $x_0 = 0$ έχουμε: $x = vt$

Διάγραμμα $x-t$

$$x = x_0 + \upsilon t$$

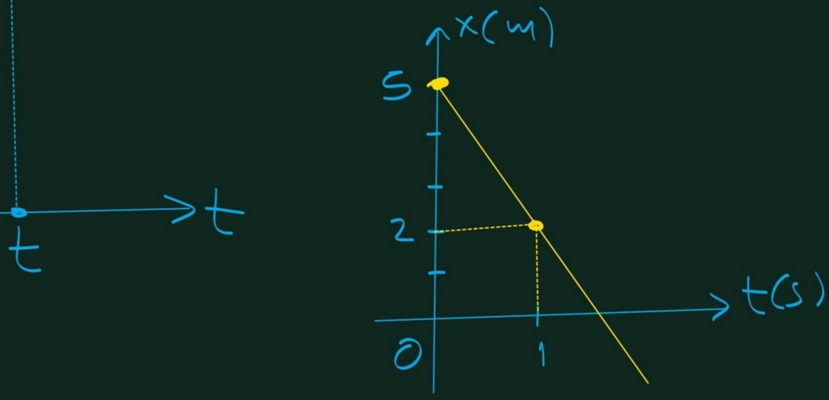


Π.χ. $x = 5 - 3t$

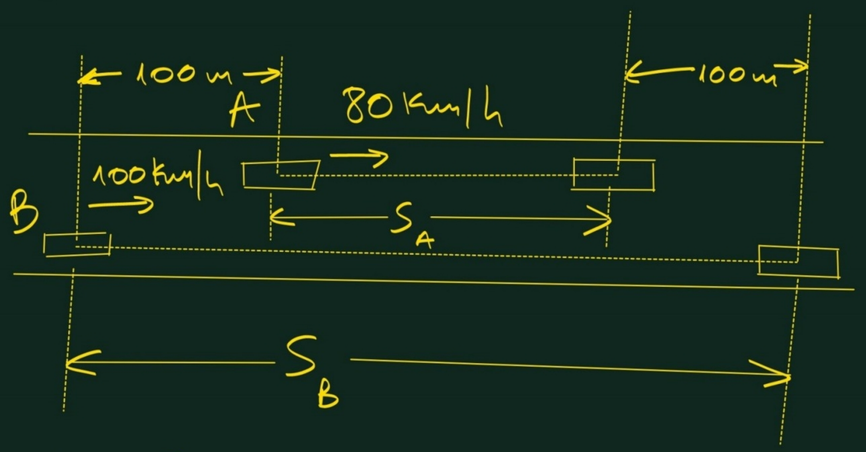
x	t
5	0
2	1

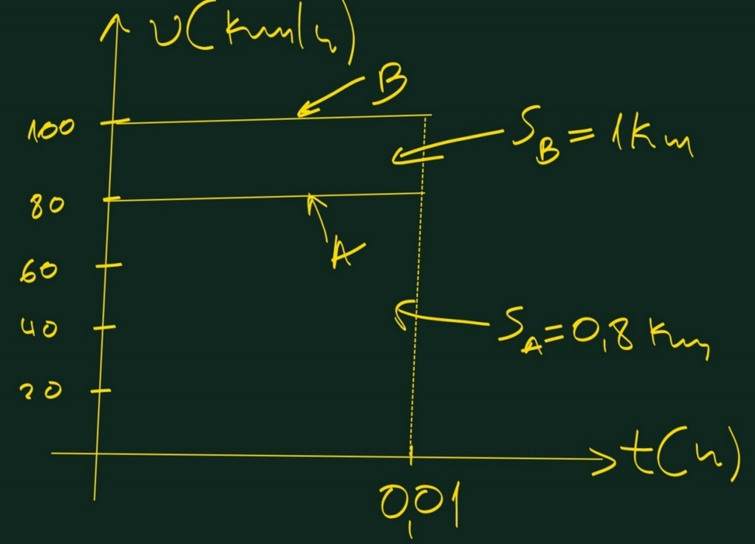
$x_0 = 5\,m$

$\upsilon = -3\,m/s$



Εφαρμογή σελ. 46.





$S_B - S_A = 200\,m \Rightarrow$

$\upsilon_B t - \upsilon_A t = 0,2\,km \Rightarrow$

$100t - 80t = 0,2 \Rightarrow 20t = 0,2 \Rightarrow t = 0,01h$ ή $t = 0,01 \cdot 3.600 = 36 sec$

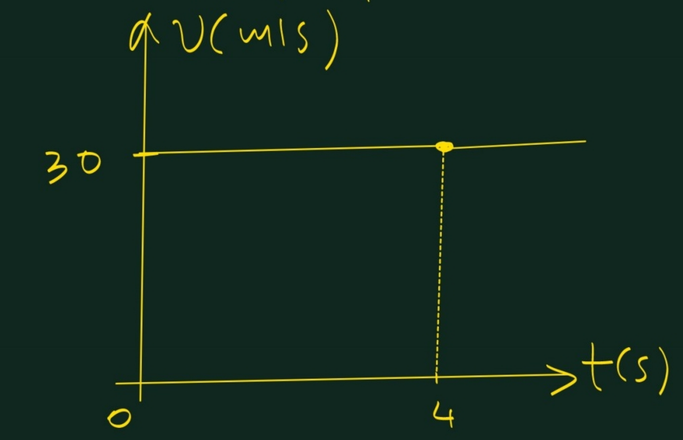
Ασκ. 1 σελ. 69.)

$$\upsilon = \frac{S}{t} = \frac{120}{4} = 30\,m/s.$$

$$\left(\upsilon = \frac{\Delta x}{\Delta t} = \frac{x}{t} \right)$$

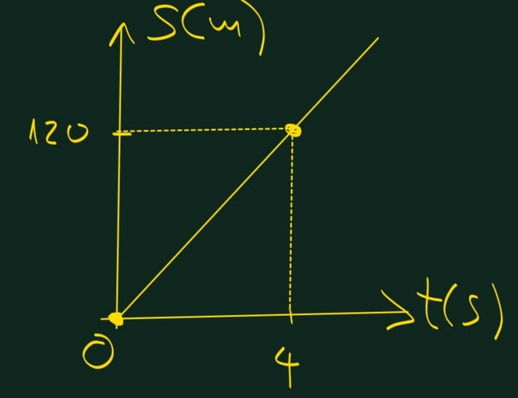
$$\left. \begin{array}{l} \Delta x = x - x_0 \\ \Delta t = t - t_0 \\ \text{Αν } x_0 = 0 \\ \text{και } t_0 = 0 \end{array} \right| \Rightarrow x = \upsilon \cdot t$$

Διάγραμμα υ-t



$S = \upsilon \cdot t \Rightarrow S = 30t\,(SI)$

Διάγραμμα S-t



Ασκ. 3.74)(Φυλλ.)

$x = 12 - t \quad (SI)$

$x = x_0 + v \cdot t$

Άρα: $x_0 = 12\,m$

και $v = -1\,m/s$.

α) Θέτουμε $x = 0$

$x = 12 - t \Rightarrow 0 = 12 - t_1 \Rightarrow$

$t_1 = 12\,sec.$

β) $x(t) = 12 - t \quad (SI)$

$x(0) = 12 - 0 = 12\,m$

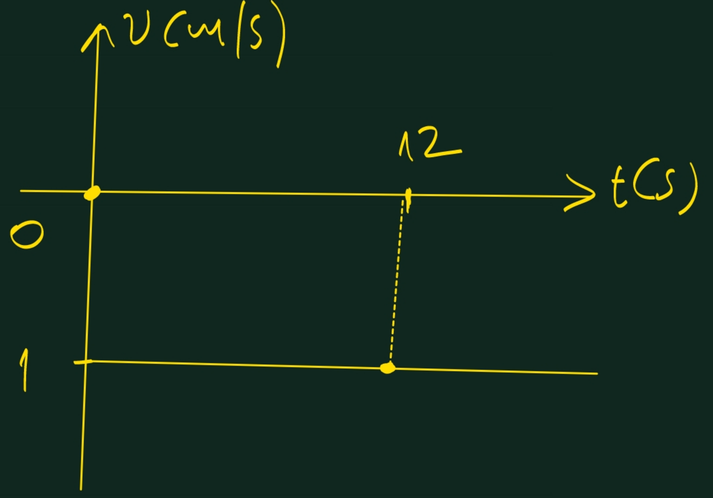
$x(5) = 12 - 5 = 7\,m$

$\Delta x = x(5) - x(0) \Rightarrow$

$\Delta x = 7 - 12 \Rightarrow$

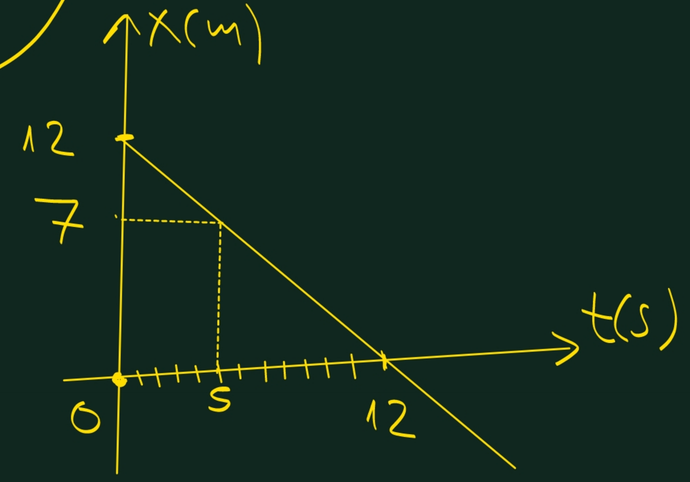
$\Delta x = -5\,m$

γ)

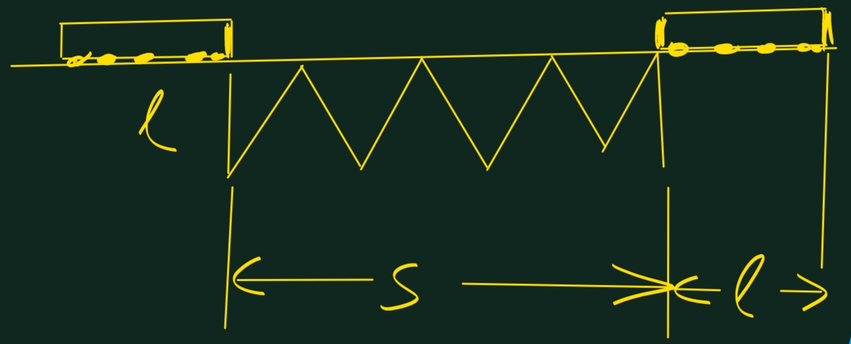


$x(0) = 12\,m$

$x(12) = 0\,m$



Ασκ. 2 σελ. 69.

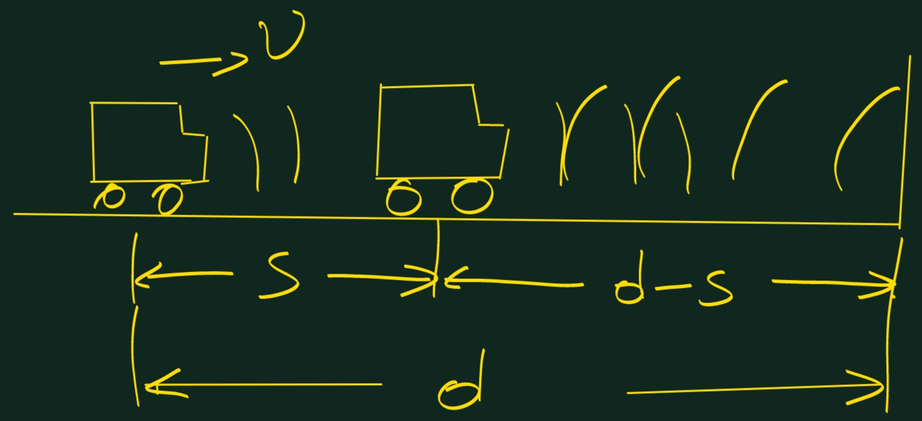


$S+l=v\cdot t \Rightarrow$

$1980+20=10\cdot t \Rightarrow$

$\frac{2000}{10}=\frac{10t}{10} \Rightarrow t=200\,sec$

Ασκ 3.56 (Αθανασόφορο)



$v=72\,km/h=\frac{72.000\,m}{3.600\,sec}=20\,m/s.$

$S=v\cdot\Delta t \Rightarrow S=20\cdot 2 \Rightarrow S=40\,m$

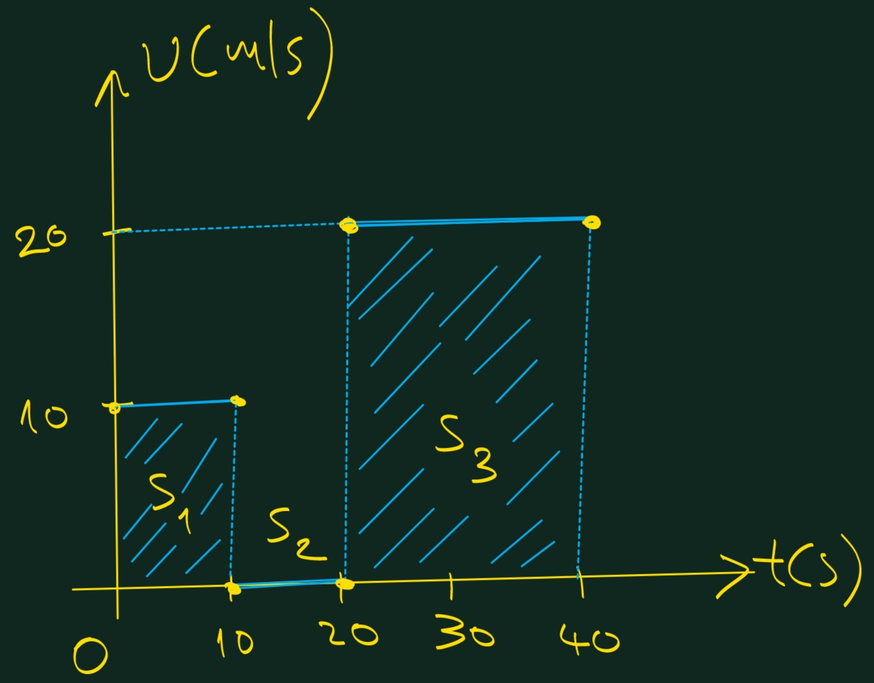
$d+d-S=v_{\pi x}\cdot\Delta t \Rightarrow 2d-40=340\cdot 2 \Rightarrow$

$2d=40+680 \Rightarrow$

$\frac{2d}{2}=\frac{720}{2} \Rightarrow d=360\,m$

$v_{\pi x}=340\,m/s$

Ασκ. 3 σελ. 69



$\Delta x = x - x_0 = x$

αν $x_0 = 0$

και $\Delta x = S$.